

## **REMARKS**

The following is the disposition of the claims. Claims 1-8 have been amended.

### **Claim Rejections Under 35 U.S.C. § 102**

In the Office Action dated April 26, 2006, the Examiner rejected claims 1-8 under 35 U.S.C. 102(b) as being anticipated by Harwell et al. (US 4,770,906).

Applicant respectfully traverses the above-stated rejection of Applicant's claims 1-8 under 35 U.S.C. § 102(b). Applicant's independent claim 1, as currently amended, is directed to a substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate.

Harwell teaches a method of producing polymeric films on substrate surfaces where the surfaces are non-planar surfaces, porous objects, such as aluminum plates, or particulate matter, such as alumina powder.

Harwell does not teach or even suggest producing a substrate comprising a plurality of individual fibers having at least one surface,

wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate. Additionally, the Harwell reference does not teach or even suggest Applicant's disclosed and claimed methodology for providing such a substrate. As such, the Harwell '906 reference does not disclose each and every limitation of the Applicant's currently amended claims. The Harwell '906 reference is not, therefore, a proper 102(b) anticipatory reference.

In view of the above, it is respectfully requested that the Examiner withdraw the rejection of claim 1, and thus claims 2-8 depending therefrom, under 35 U.S.C. § 102(b), and pass such claims to an expedient issue.

#### Claim Rejections Under 35 U.S.C. § 103

In the Office Action dated April 26, 2006, the Examiner rejected claims 1-5, 7, and 8 under 35 U.S.C. § 103(a) as being unpatentable over Diehl et al. (US 5,623,015).

The rejection of claims 1-5 and 7-8 is respectfully traversed on the basis that the Diehl et al. '015 reference does not teach, disclose, or even suggest Applicants' substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of

individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate. Additionally, the Harwell reference does not teach or even suggest Applicant's disclosed and claimed methodology for providing such a substrate. In fact, the Diehl et al. '015 reference specifically does not disclose each and every element recited in Applicants' independent claim (for example a substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate), and thus, each of the claims which depend therefrom.

Applicants inventive concept, as recited in a claim 1, resides in a substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate. The admicellar polymerization reaction takes place on at least one surface of the plurality of individual fibers of the substrate. The aqueous hydrophobic coating composition is placed on at least one surface of the plurality of individual fibers of the substrate and thereafter an

initiator is added to the composition. After a predetermined period of time, an admicellar hydrophobic polymer coating forms on at least one surface of the plurality of individual fibers of the substrate to provide a substrate comprising a plurality of individual fibers having at least one surface, wherein the at least one surface of the plurality of individual fibers having an admicellar hydrophobic polymer coating thereon. Thus, the resulting product is a substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate.

In contrast, there is no specific or inherent teaching and/or suggestion in the Diehl et al. '015 reference of a substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate. The Diehl et al. '015 reference does not teach, disclose, or even suggest Applicant's coated substrate produced by utilizing admicellar polymerization for coating at least one surface of the plurality of individual fibers of the substrate. Rather, the Diehl et al. '015 reference teaches the use of a latex binder

composition utilized on nonwoven cellulosic based substrates to impart high wet tensile strength. The Diehl et al. '015 reference, therefore, teaches the method of forming a polymer in solution and thereafter applying it to the fabric. Such a technique results in the polymer filling in the voids between the threads of the fabric as well as encasing the threads (i.e. a binder composition). Such an encasement of the threads results in a stiff and inflexible piece of material -- a property that does not occur utilizing the Applicants' claimed methodology. Thus, the Diehl et al. '015 reference teaches away from Applicants' presently claimed invention.

By definition, a binder (such as that disclosed by the Diehl et al. '015 reference) imparts mechanical strength and increases structural integrity by bonding together separate filaments and fibers of a substrate. To achieve this, the binder must (1) bridge between elements, (2) must contact and/or envelope the elements, and (3) generally fill in interstitial voids between the elements in order to make an integrated material, which significantly decreases the air permeability of the substrate.

The Applicant's admicellarly coated substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon, the substrate also having an air permeability ratio of at least 95% of the air permeability of an uncoated substrate is chemically as

well as physically different than the binder composition disclosed and taught by the Diehl et al. '015 reference. Admicellar polymerization does not have discrete spherical particles forming the film. Thus, it coats each individual fiber only and does not bridge between the individual fibers. On a cotton fabric, for example, such a treatment yields a cylindrical shell around the cellulose fiber. Additionally, the use of admicellar polymerization results in a smaller amount of the coating material being used in the Applicant's presently claimed invention. The coated fibers retain substantially the same air permeability as the uncoated material, which is in direct opposition to the teachings of the Diehl et al. '015 reference. The air permeability of the coated materials in the Diehl et al. '015 reference is significantly decreased because of the way the binder bridges the fibrous elements and fills in the interstitial voids thereby creating an integrated material that is substantially impermeable.

The Diehl et al. '015 reference teaches that the latex binder composition is generally formed by emulsion polymerization to attain relatively high concentrations in a liquid phase for the purpose of binding. The liquid formulation involves the preparation of dispersions, meaning fairly high concentrations of such compounds in aqueous media. Thus, the polymer coating disclosed in the Diehl et al. '015 reference is formed in solution and then applied to the material.

This is in opposition to Applicant's claimed use of admicellar polymerization. The nature of admicellar polymerization is not to create formulations that lead to dispersions that are rich in polymer or that will deposit thick three-dimensional macroscopic layers. "Dispersions" is a special teaching to the use of concentrated polymer that is present in a bulk solution directly contrasting to the admicellar polymerization of Applicants' presently claimed invention. The final product of the presently claimed admicellar polymerization does not yield a polymer mixture that bridges or fills the voids between the fibers in a three-dimensional network.

Applicants' presently claimed invention, as recited in amended claim 1, is a substrate having an admicellar polymer coating composition, not a binder composition. The presently claimed admicellar hydrophobic polymer coating forms only on the at least one surface of the plurality of individual fibers of the substrate not throughout the voids and interstitial spaces created by the plurality of individual fibers of the substrate. If the process disclosed in the Diehl et al. '015 reference was used, the advantageous physical properties of the presently claimed admicellar polymer coating would be lost. Further, the binder taught by the Diehl et al. '015 reference renders the substrate substantially stiffer and significantly more inflexible than the Applicants' presently claimed admicellar coating composition applied to a substrate. Complete filling of the voids found in the substrate

material, as taught by the Diehl et al. '015 reference, significantly decreases the air permeability of the substrate material. This is directly opposite to Applicants' substrate coated using the admicellar polymerization process which maintains the air permeability ratio of at least 95% of the air permeability of an uncoated substrate.

Therefore, Applicants respectfully submit that the claims are not obvious in view of the Diehl et al. '015 reference and request reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejection of the claims as being unpatentable over the Diehl et al. '015 reference, and that the claims be expediently passed to an expedient issuance.

#### Claim Rejections Under 35 U.S.C. § 103

In the Office Action dated April 26, 2006, the Examiner rejected claims 1-5, 7, and 8 under 35 U.S.C. § 103(a) as being unpatentable over Raynolds et al. (US 5,919,716).

The rejection of claims 1-5 and 7-8 is respectfully traversed on the basis that the Raynolds et al. '716 reference does not teach, disclose, or even suggest Applicant's claimed invention involving an admicellar hydrophobic polymer coating composition and method of making and using.

Applicant's inventive concept is set forth in particular with respect to the arguments made against the Diehl et al. '015 reference. The Raynolds

et al. '716 reference does not disclose, teach, or even suggest such a substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate. Rather, the Raynolds et al. '716 reference teaches a polymer composition utilized for backcoating woven substrates and as a binder composition for non-woven substrates -- i.e. the same type of "binder" coating composition as discussed by the Diehl et al. '015 reference.

The Applicant's substrate comprising a plurality of individual fibers having at least one surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate. The resulting substrate is chemically as well as physically different than the backcoating disclosed and taught by the Raynolds et al. '716 reference. Admicellar polymerization does not have discrete spherical particles forming the film. Thus, it coats each individual fiber only and does not bridge between the individual fibers. On a cotton fabric, for example, such a treatment yields a cylindrical shell around the cellulose fiber. Additionally, the use of admicellar polymerization results in a smaller amount of the coating material being used in the

Applicant's presently claimed invention. The coated fibers retain substantially the same air permeability as the uncoated material, which is in direct opposition to the teachings of the Raynolds et al. '716 reference. The air permeability of the coated materials in the Raynolds et al. '716 reference is significantly decreased because of the way the binder bridges the fibrous elements and fills in the interstitial voids thereby creating an integrated material that is substantially impermeable.

The Raynolds et al. '716 reference, in particular, teaches that a polymer composition is formed by dispersion polymerization. Dispersion polymerization refers to a suspension or emulsion polymerization that must attain relatively high concentrations of polymer in a liquid phase for the purpose of binding to and encapsulating the substrate. The composition taught by the Raynolds et al. '716 reference is a bulk solution that contains a large amount of polymer in order to provide a three dimensional incorporation of the binder into the final composite material or substrate. The liquid formulation disclosed in the Raynolds et al. '716 reference involves the preparation of one or more dispersions, -- i.e. a mixture containing a fairly high concentration of polymers that are suspended in the aqueous media before the mixture is applied to the substrate.

As discussed herein above, the Applicant's presently claimed invention is a substrate comprising a plurality of individual fibers having at least one

surface, wherein at least one surface of the plurality of individual fibers has an admicellar hydrophobic polymer coating thereon. The resulting substrate also has an air permeability ratio of at least 95% of the air permeability of an uncoated substrate. Admicellar polymerization does not create a formulation that would be classified as a dispersion -- i.e. one that is rich or contains a high concentration of polymer. Furthermore, Applicant's coating composition does not deposit a thick three-dimensional macroscopic layer as does the coating composition disclosed by the Raynolds et al. '716 reference. The presently claimed coating composition used to coat the substrate does not contain polymers that bridge between the fibers in the three-dimensional network of the substrate so as to promote binding. Rather, the presently claimed coating composition forms a polymer layer only on the at least one surface of the plurality of individual fibers of the substrate and not in the interstitial voids of the substrate as taught by the Raynolds et al. '716 reference.

Therefore, Applicants respectfully submit that claims 1-5 and 7-8 are not obvious in view of the Raynolds et al. '716 reference and request reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejection of the claims as being unpatentable over the Raynolds et al. '716 reference, and that the claims be expediently passed to an expedient issuance.

### Claim Rejections Under 35 U.S.C. § 103

In the Office Action dated April 26, 2006, the Examiner rejected claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Raynolds et al. (US 5,919,716) in view of Pickelman et al. (US 4,582,663).

Claims 6 is not obvious over the Raynolds et al. '716 reference in view of the Pickelman et al '663 reference. That is, claim 6 depends from claim 1. As discussed above, claim 6 is clearly patentable over the Raynolds et al. '716 reference. For this reason alone, it is respectfully submitted that claim 6 is patentable over the Raynolds et al. '716 reference in view of the Pickelman et al. '663 reference.

Therefore, Applicants respectfully submit that claim 6 is not obvious in view of the Raynolds et al. '716 reference in view of the Pickelman et al. '663 reference and request reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejection of the claims as being unpatentable over Raynolds et al. in view of the Pickelman et al. '663, and that the claims be expediently passed to issuance.

### **Conclusion**

It is respectfully submitted that this application is in condition for allowance for the reasons stated above. Therefore, it is requested that the Examiner reconsider each and every rejection as applicable to the claims now pending in the application and pass such claims to issue.

This amendment is intended to be a complete response to the Office Action dated April 26, 2006. In the event that any outstanding issues remain that would delay the allowance of this application, the examiner is urged to contact the undersigned to **telephonically** discuss such outstanding issues.

Respectfully submitted,



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